

FAST-NEUTRON SCATTERING AT $Z = 50$:- TIN

by

A. B. Smith

Argonne National Laboratory
Argonne, Illinois
and
The University of Arizona
Tucson, Arizona

ABSTRACT

Neutron total cross sections of elemental tin were measured from ≈ 0.8 to 4.5 MeV with energy detail sufficient to average intermediate structure. Neutron elastic- and inelastic-scattering cross sections were measured from ≈ 1.5 to 10 MeV. Below 3 MeV 10 angular intervals were used distributed between $\approx 20^\circ$ and 160° , and the incident energy increments were ≈ 0.1 MeV. From 3 to 4 MeV twenty angular intervals, distributed over the same angular range, were used, and the energy increments were ≈ 0.2 MeV. From 4.5 to 10 MeV the measurements were made at ≥ 40 angular intervals distributed between $\approx 17^\circ$ and 160° , and at energy increments of ≈ 0.5 MeV. Inelastic neutron groups corresponding to average excitations of approximately 1.15 and 2.27 MeV were observed. The experimental results were combined with elemental and isotopic values available in the literature, extending from ≈ 0.4 to 24 MeV, to form a comprehensive data base for physical interpretations using optical-statistical, dispersive-optical and coupled-channels models. The parameters of the models were determined in detail, including isospin, and collective effects. These physical interpretations were compared with present and previously-reported experimental results and with theoretical physical concepts.